Botanical Survey of Boot Island National Wildlife Area, Nova Scotia, 2004

Ruth E. Newell, Colin M. MacKinnon and Andrew C. Kennedy

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21 March, 2006

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ABSTRACT

A flora survey for Boot Island National Wildlife Area was conducted in September of 2004. During the survey, 109 species of plants were recorded within this small, 144 ha, protected area (85% salt marsh, 10% old field and 5% forest). Voucher specimens were deposited in the E. C. Smith Herbarium (ACAD), Irving Biodiversity Collection, K. C. Irving Environmental Science Centre, Acadia University, Wolfville, Nova Scotia. Two rare species were recorded; *Iva frutescens* - 'Big-leaf Marsh-elder' (S2SE) and *Suadeda calceoliformis* - 'American Sea-blite' (S2S3) (Atlantic Canada Conservation Data Centre ranks in brackets). Boot Island has a long history of human use, such that a large percentage of exotic or non-native plants were recorded; primarily within the upland areas and the bank/cliff on the east side of the island.

RÉSUMÉ

Un relevé floristique de la Réserve nationale de faune de l'Île Boot mené en septembre 2004 a permis de constater la présence de 109 espèces de végétaux dans cette zone protégée d'à peine 144 ha, dont 85 % de marais salés, 10 % de champs abandonnés et 5 % de forêts. Les spécimens témoins ont été déposés à l'herbier E.C. Smith (ACAD) de l'Irving Biodiversity Collection, K.C. Irving Environmental Science Centre, Acadia University, à Wolfville, en Nouvelle-Écosse. Deux des espèces sont rares : l'ive arbustive (*Iva frutescens*), à laquelle le Centre de données sur la conservation du Canada Atlantique a attribué la cote S2SE, et le suéda couché (*Suaeda calceoliformis*), auquel cet organisme a attribué la cote S2S3. Comme l'île Boot a longtemps été utilisée par les humains, sa flore comporte une forte proportion d'espèces exotiques ou non indigènes, qui se rencontrent principalement dans les terrains élevés de l'île et sur les berges et falaises de sa rive orientale.

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Introduction

Boot Island is a small 144 ha island located at the mouths of the Gaspereau and Avon Rivers in the Southern Bight of the Minas Basin of the Bay of Fundy (45°08'41"N, 64°15'51"W). It was a part of mainland Nova Scotia until the 1860's at which time The Guzzle channel formed isolating Boot Island from the mainland (Bleakney, 2004).

Boot Island was established as a National Wildlife Area (NWA) in 1979 under the jurisdiction of the Canadian Wildlife Service. Ownership lies with the government of Canada. It is currently the site of nesting colonies of Great Black-backed and Herring Gulls, Double-crested Cormorants and Great Blue Herons. In the past it was also a crow roosting area.

This report presents the results of a botanical survey conducted over a two-day period by botanist Ruth E, Newell (B.Sc. Hons., M.Sc.) with assistance provided by Reg. B. Newell, (B.Sc., M.Sc.).

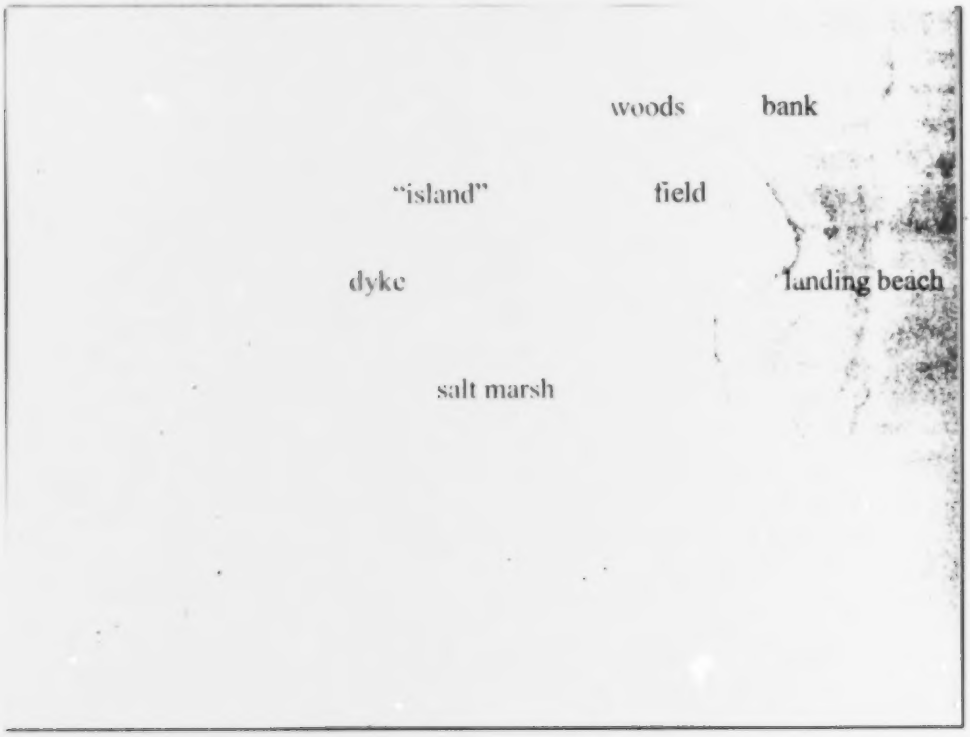

Figure 1. Aerial photograph of Boot Island.

Methodology

The survey was conducted on September 5th and 6th , 2004. All major terrestrial habitats were visited and species lists of vascular plants made up for each. Relative abundances for each species were also documented. Any species of significance were geo-referenced with a GPS unit (Garmin 12). Photographs were taken of each habitat.

Botanical nomenclature used in this report follows Roland (1998) with a few exceptions. For a listing of synonyms see the NatureServe Explorer website: http://www.natureserve.org/explorer.

Voucher specimens of selected species will be deposited in the E.C. Smith Herbarium (ACAD), Irving Biodiversity Collection, K.C. Irving Environmental Science Centre, Acadia University, Wolfville, Nova Scotia.

Because this survey was limited to a one-time site visit relatively late in the growing season, there is a possibility that some earlier flowering/fruiting plants may have been missed. The timing of the survey was based on when the highest number of species could be readily observed and or identified.

Some species were not identified to species due to the lack of appropriate plant structures e.g., fruiting material, which in certain cases are necessary for positive identification. These plants were identified only to the genus level.

All vascular plant species observed during this survey together with the habitats in which they were found are presented in APPENDIX A. This appendix also includes the relative abundance of each species within its habitat and its sub-national i.e. provincial rank as provided by the Atlantic Canada Conservation Data Centre (ACCDC) on their website (http://www.accdc.com/products/lists/). An explanation of the different sub-national ranks is also provided in this report in APPENDIX B.

Species with an ACCDC rank of S3 or lower, together with specific location data within the Boot Island NWA are listed in Table 1.

Table 2 gives the percentage of exotic species occurring within each habitat type.

Parts of the salt marsh on the south side of the island were not surveyed because they were isolated by tidal creeks and therefore very difficult to access.

Results

Description of the island:

Boot Island was until the mid 1800's joined to the mainland by a neck of land at the east end of Long Island. It is now separated by a narrow guzzle (The Guzzle) which locals claim is still traversable by foot at times of extreme low tide. Since 1760, Boot Island has lost 50% of it's land mass and is continuing today to erode at a significant rate (Bleakney, 2004).

Salt marsh habitat comprises most of the landmass of Boot Island (Figure 1). The salt marsh surface is cut by many creek channels most of these draining to the southeast. One major channel runs nearly the entire length of the salt marsh. This creek snakes across the salt marsh in a general southwest/northeast direction almost bisecting this habitat. Other land features present on the salt marsh include scattered tidal pools, *Spartina alterniflora*-dominated, shallow depressions and the remnants of a dyke.

Shoreline habitat varies from salt marsh to sand beach. Sand beaches occur at the east end of the island as well as along many sections of the north side of the island.

There is an upland area at the eastern end of Boot Island. A small part of this is wooded. The bulk of the upland area however, is open field. Isolated from the open upland area by salt marsh is another upland area - a small "island" of high ground. Today, a remnant dyke runs south southeast from this island across the salt marsh.

Behind a sand beach (the "landing" beach) at the eastern end of Boot Island is a small barachois pond.

A steep bank or cliff occurs from the upland area down to the beach at the eastern end of the island.

Habitat Descriptions:

1. Sand Beaches

At the south end of the upland area is a sand beach (Figure 2). This is a commonly used site for landing boats on the island. This sand beach continues around the northeastern end of the island where it becomes quite rocky. Other sand beaches occur along the upper northwest side of the island (Figure 3). The sand beaches on Boot Island typically have scattered patches of Salt-meadow Cordgrass (*Spartina patens*). There are also occasional patches of Seashore Saltgrass (*Distichlis spicata*) and Seaside Alkali Grass (*Puccinellia americana*). Other scattered to common species include American Sea-rocket (*Cakile edentula*), Seaside Goldenrod (*Solidago sempervirens*), wheatgrasses (*Elymus* spp.), and Sea Lavender (*Limonium carolinianum*).

The section of beach, which lies at the base of a steep-sided bank along the entire northeast end of the island, has little to no vegetation (Figure 13).

A complete listing of species occurring in this habitat can be found in APPENDIX A.

Figure 2. Sand beach on the lower east side of Boot Island showing scattered patches of Salt-meadow Cordgrass (*Spartina patens*). The vegetation on the right in the background is Saltwater Cordgrass (*Spartina alterniflora*) and marks the intertidal zone.

Figure 3. Sand beach on the northwest shoreline of Boot Island. Vegetation at the top of beach is predominantly Salt-meadow Cordgrass (*Spartina patens*). Vegetation to the left in the intertidal zone is primarily Saltwater Cordgrass (*Spartina alterniflora*).

2. Wooded Upland

Figure 4. Robust stands of Stinging Nettle (*Urtica dioica* ssp. *gracilis*) and Spotted Jewelweed (*Impatiens capensis*) occur periodically at the edges and within the small woodland on Boot Island.

At the northeastern end of the island is a narrow strip of woods (Figure 1). The most common tree species is White Spruce (*Picea glauca*). Other tree species present include Red Maple (*Acer rubrum*), Trembling Aspen (*Populus tremuloides*) (Figure 5), Balsam Fir (*Abies balsamea*), Apple (*Pyrus malus*) and Larch (*Larix laricina*). The shrub, Red Elderberry (*Sambucus racemosa*) often dominates the understory (Figure 7). Other shrub species present include Common Elderberry (*Sambucus canadensis*), Skunk Currant (*Ribes glandulosum*), Wild Raspberry (*Rubus idaeus* ssp. *strigosus*), Virginia Rose (*Rosa virginiana*), and Bayberry (*Myrica pensylvanica)*. In some parts of the woodland herbaceous growth is very vigorous with Spotted Jewelweed (*Impatiens capensis*) and Stinging Nettle (*Urtica dioica ssp. gracilis*) plants reaching heights of more than 10 ft. (Figure 4). Both of these species are locally abundant. Some very robust plants of Catchweed Bedstraw (*Galium aparine*) were also observed climbing over other vegetation.

A complete listing of species occurring in this habitat can be found in APPENDIX A.

The woods are extremely difficult to walk through, as there is very dense growth of tree trunks and shrub thickets.

In some sections of the woodland, there are dead standing trees (Figure 6). These appear to correspond to bird nesting colonies as many still contain nests.

Figure 5. The edge of a stand of Trembling Aspen (*Populus tremuloides*). The dominant grass in the open area on the right side of the photo is Colonial Bentgrass (*Agrostis capillaris*).

Figure 6. A section of dead standing trees within the wooded area. Remnant bird nests are still present in the upper branches. The foreground represents part of the upland field habitat. Some of the species in the foreground are Arrow-leaved Tearthumb (*Polygonum sagittatum*), Spotted Jewelweed (*Impatiens capensis*), Wild Radish (*Raphanus raphanistrum*), Colonial Bentgrass (*Agrostis capillaris*) and Bull Thistle (*Cirsium vulgare*). The Spotted Jewelweed also forms very dense colonies within and along the periphery of the woodland.

Figure 7. Part of the understory in the woodland habitat. Species present include Wild Raspberry (*Rubus idaeus* ssp. *strigosus*) and Red Elderberry (*Sambucus racemosa*).

3. Upland - Open Field (includes "island" upland)

Separating the woods and the salt marsh at the northeast end of the island is a large upland area of open field. Much of this habitat is dominated by two species of wild mustard - Wild Radish (*Raphanus raphanistrum*) and Hairy-pod Hedge Mustard (*Sisymbrium officinale*). This is particularly the case within the lower (southeastern) half of the open upland area (Figure 8). These two species indeed seem to thrive in several habitats on Boot Island. Near the woodland edge a number of shrubs dominate forming an almost impenetrable thicket. These include Virginia Rose (*Rosa virginiana*), Wild Raspberry (*Rubus idaeus ssp. strigosus*) and Bayberry (*Myrica pensylvanica*).

Other common to abundant herbaceous species occurring across the open upland are Canada Thistle (*Cirsium arvense*), Marshpepper Smartweed (*Polygonum hydropiper*), Arrow-leaved Tearthumb (*Polygonum sagittatum*), Field Sowthistle (*Sonchus arvensis*), wheat-grasses (*Elymus* spp.), chickweeds (*Stellaria* spp.), Rough Goldenrod (*Solidago rugosa)*, Flat-topped Fragrant Goldenrod (*Euthamia graminifolia*), Spotted Jewelweed (*Impatiens capensis*), Colonial Bentgrass (*Agrostis capillaris*) and Black Sedge (*Carex nigra*) (Figures 5, 6 & 9). See APPENDIX A for a complete listing of species observed in this habitat.

There are occasional White Spruce (*Picea glauca*) as well as occasional clumps of Reed Canary Grass (*Phalaris arundinacea*) (Figure 9 & 10) throughout the open upland.

Figure 8. The southeastern section of the open field upland area is dominated by two annual species of wild mustard – Wild Radish (*Raphanus raphanistrum*) and Hairy-pod Hedge Mustard (*Sisymbrium officinale*). Many of these plants had completed their life cycle and had died, hence the preponderance of brown plants in the photo.

Figure 9. Wild mustards, thistles and Flat-topped Fragrant Goldenrod (*Euthamia graminifolia*) are shown in this photo of one part of the open field upland. Cone-laden White Spruce (*Picea glauca*) are evident in the background. These are thinly scattered within the open upland habitat.

Figure 10. Field (open upland area) with wild mustards dominating in the foreground and several clumps of Reed Canary Grass (*Phalaris arundinacea*) behind.

Figure 11. Upland field (facing northeast) with Wild Raspberries and grasses in the foreground and a sea of goldenrod (Rough Goldenrod/*Solidago rugosa* and Flat-topped Fragrant Goldenrod/*Euthamia graminifolia*) just beyond the raspberries.

"Island" Upland

West of the main upland area is a small, isolated upland, an "island" surrounded by salt marsh habitat (Figure 1). The vegetation on this isolated upland area represents a mixture of graminoids, forbs and shrubs. Trees are absent. The most common plants found on this isolated upland area are Wild Radish (*Raphanus raphanistrum*), Rough Goldenrod (*Solidago rugosa*), Wild Raspberry (*Rubus idaeus ssp. strigosus*), Reed Canary Grass (*Phalaris arundinacea*), Red Elderberry (*Sambucus racemosa*) and Canada Holly (*Ilex verticillata*). The periphery of the island is dominated by Orache species (*Atriplex* spp.), Annual Ragweed (*Ambrosia artemisiifolia*), Foxtail Barley (*Hordeum jubatum*), Seaside Goldenrod (*Solidago sempervirens*) and wheatgrasses (*Elymus* spp.). The photograph below (Figure 12) was taken from the island looking north eastwards across the salt marsh towards the wooded part of Boot Island. The vegetation in the lower half of the photo is located on the island and is composed mainly of Wild Radish (*Raphanus raphanistrum*).

Figure 12. Upland "island" occurring within the salt marsh. The photograph was taken from the island facing northeast. A small part of the island can be seen in the foreground. Plants present in the foreground are primarily wild mustards. The main upland area with both field and woodland habitats can be seen in the distance.

4. Bank/Cliff

Figure 13. Bank and beach at northeast end of Boot Island. Swallow nests occur in the uppermost section of the bank face. Little to no vegetation occurs on this particular beach.

A steep-sided bank or cliff occurs along the entire northeast end of Boot Island above the beach (Figure 13). This bank drops down from the wooded and open field upland areas. Swallow nests were observed at the southern end of this bank. The bank face is unstable resulting in a highly disturbed habitat. This is reflected in the high percentage of exotics that occur in this particular habitat type (51.4%). Common to abundant species occurring on this bank include Wild Radish (*Raphanus raphanistrum)*, Sheep Sorrel (*Rumex acetosella)* and Hairy-pod Hedge Mustard (*Sisymbrium officinale)*. Other scattered to common species include: White Clover (*Trifolium repens)*, Colt's-foot (*Tussilago farfara) and several* Knotweed/Smartweed species (*Polygonum* spp.). Some sections of this bank are fairly densely vegetated whereas others are not.

A complete listing of species occurring in this habitat can be found in APPENDIX A.

5. Salt Marsh

Upper or Head of Salt Marsh

At the head or upper edge of the salt marsh there is a distinctive zone of vegetation with extensive stands of Chaffy Sedge (*Carex paleacea*) and Freshwater Cordgrass (*Spartina pectinata*) plus smaller stands of other species such as Broad-leaf Cattail (*Typha latifolia*) and Saltmarsh Bulrush (*Scirpus maritimus*) (Figure 14). Other common species in this habitat include: Egede Cinquefoil (*Argentina egedii*) (Figure 15), Black Grass Rush (*Juncus gerardii*), Annual Ragweed (*Ambrosia artemisiifolia*), goosefoot species (*Chenopodium* spp.), Salt-meadow Cordgrass (*Spartina patens*) and Orache species (*Atriplex* spp.).

Often a line of wrack (made up mostly of dead pieces of Saltwater Cordgrass - *Spartina alterniflora* stems) (Figure 16) is present.

A complete listing of species occurring in this habitat can be found in APPENDIX A.

Figure 14. A desiccated pool at the upper edge or head of the salt marsh. In the vicinity of the pool there were stands of Saltmarsh Bulrush (*Scirpus maritimus*), Soft-stem Bulrush (*Scirpus tabernarmontanae*), Broad-leaf Cattail (*Typha latifolia*), Chaffy Sedge (*Carex paleacea*), Freshwater Cordgrass (*Spartina pectinata*), Spreading Bentgass (*Agrostis stolonifera*) and Fowl Bluegrass (*Poa palustris*). A stranded species of a duckweed (*Lemna minor*) was present on the exposed mud surface of the pool.

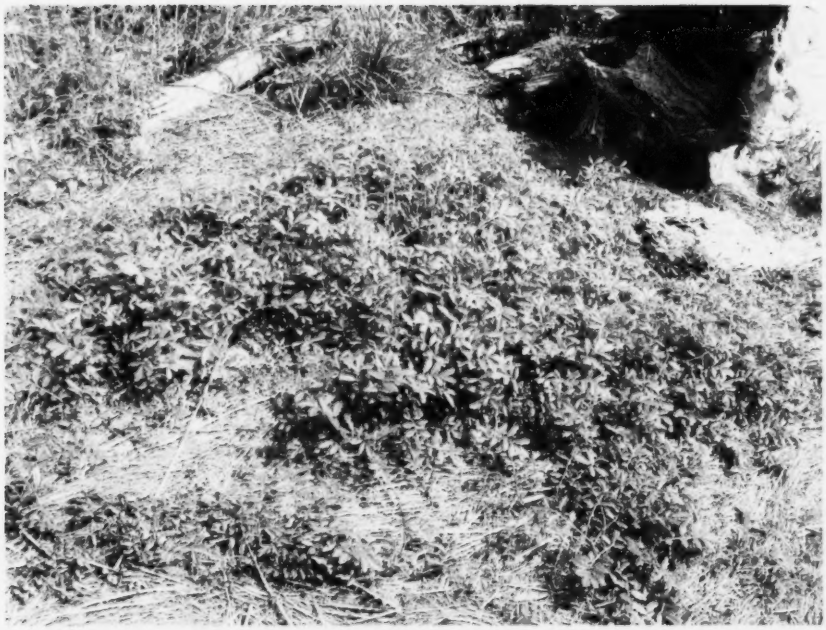

Figure 15. A patch of Egede Cinquefoil (*Argentina egedii*) along the upper edge of the salt marsh.

Figure 16. A wrack line at the head of the salt marsh separating upland habitat on the right from salt marsh habitat on the left. Vegetation present in photo on the right includes wild mustards, Field Sowthistle (*Sonchus arvensis*), Bull Thistle (*Cirsium vulgare*), Annual Ragweed (*Ambrosia artemisiifolia*), Curly Dock (*Rumex crispus*), Spotted Jewelweed (*Impatiens capensis*), New York Aster (*Aster novi-belgii*); vegetation on the left in the upper salt marsh: Seaside Goldenrod

(*Solidago sempervirens*), Freshwater Cordgrass (*Spartina pectinata*), and Annual Ragweed (*Ambrosia artemisiifolia*).

An old dyke runs southwards from the "island" upland (Figure 1) and crosses the marsh to the southeast side of Boot Island. The dyke is now breeched in several places by salt marsh creeks. During this survey, Big-leaf Marsh-elder (*Iva frutescens*) (Figure 17) was observed only in the vicinity of the "island" upland in upper salt marsh habitat and along the top of the old dyke (Figure 18).

Figure 17. Big-leaf Marsh-elder (*Iva frutescens*) on Boot Island in upper salt marsh just west of "island" upland. This species also occurs on an old dyke, which crosses the salt marsh.

Figure 18. In the distance, a portion of an old dyke, which crosses Boot Island from the northwest side to the southeast side of the island, can be seen. Although not immediately obvious in the photo, the dyke is marked by a dark line (arrows) within the salt marsh below the horizon. The dark line represents the occurrence of a low, salt marsh shrub, Big-leaf Marsh-elder (*Iva frutescens*) that was only observed on Boot Island on the dyke and in the immediate vicinity of the "island" upland in the upper marsh.

Middle Salt Marsh

By far the most extensive habitat on Boot Island is the middle salt marsh. Although from a distance it appears relatively uniform in terms of species associations, upon closer examination, it is more complex with a number of associations present. The most common community or association present is the *Spartina patens* or Salt-meadow Cordgrass community (Figure 19). Found thinly scattered or occasionally throughout the *Spartina patens* are Sea Milkwort (*Glaux maritima*), Sea Lavender (*Limonium carolinianum*), Jointed Glasswort (*Salicornia maritima*), Seashore Saltgrass (*Distichlis spicata*), Seaside Alkali Grass (*Puccinellia americana*) and Seaside Plantain (*Plantago maritima*). Saltwater Cordgrass (*Spartina alterniflora*) abundance within the middle marsh ranges from absent to thinly scattered within the *Spartina patens* community.

Figure 19. Salt-meadow Cordgrass (*Spartina patens*) community in the middle marsh with a Saltwater Cordgrass (*Spartina alterniflora*)-lined depression in the background.

In the vicinity of some of the salt marsh creeks Seashore Saltgrass (*Distichlis spicata*) forms the dominate species (Figure 20). Often occurring with the Seashore Saltgrass are Seashore Goldenrod (*Solidago sempervirens*), Seaside Plantain (*Plantago maritima*), Salt-meadow Cordgrass (*Spartina patens*), Sea Milkwort (*Glaux maritima*), Seaside Alkali Grass (*Puccinelia americana*), Sea Lavender (*Limonium carolinianum*), and Saltwater Cordgrass (*Spartina alterniflora*).

Figure 20. Plant community zonation within middle salt marsh: Saltwater Cordgrass (*Spartina alterniflora*) on creek edge on upper left, Seashore Saltgrass (*Distichlis spicata*) community (large area with more darkly-coloured grass) in middle and mixture of Saltwater Cordgrass (*Spartina alterniflora*) & Salt-meadow Cordgrass (*Spartina patens*) on upper right side of photo.

Another community association observed within the salt marsh on Boot Island (observed along the northwest side of the marsh), is one dominated by Seaside Plantain (*Plantago maritima*) (Figure 21). Occurring with the Seaside Plantain are Sea Lavender *Limonium carolinianum*), Common Bog Arrow Arrow-grass (*Triglochin maritima*), Saltwater Cordgrass (*Spartina alterniflora*), Seaside Goldenrod (*Solidago sempervirens*), Jointed Glasswort (*Salicornia europaea*) , Salt-meadow Cordgrass (*Spartina patens*), Sea Milkwort (*Glaux maritima*) and Seaside Alkali Grass (*Puccinellia americana*).

Figure 21. Seaside Plantain (*Plantago maritima*) community in middle salt marsh habitat. Note the small circular tidal pool on the right. It is edged with a ring of Saltwater Cordgrass (*Spartina alterniflora*).

In some areas there were equal mixtures of Saltwater Cordgrass (*Spartina alterniflora*) and Salt-meadow Cordgrass (*Spartina patens*) with thinly scattered occurrences of Sea Milkwort (*Glaux maritima*), Seaside Plantain (Plantago maritima), Seaside Alkali Grass (*Puccinellia americana*) and Sea Lavender (*Limonium carolinianum*).

These various community associations are no doubt reflections of variations in degree of salinity, elevational differences, amounts of tidal flooding occurring throughout the salt marsh and the various tolerances of each plant to these harsh environmental parameters. Another environmental factor affecting the occurrence of a particular species may be degree of drainage in a particular area.

Overall, the dominant community type within the middle salt marsh is the community dominated by Salt-meadow Cordgrass (*Spartina patens*).

Also occurring occasionally in the middle salt marsh are shallow, discrete depressions dominated by Saltwater Cordgrass (*Spartina alterniflora*) (Figure 19). Additional species occasionally found within these depressions are Salt-meadow Cordgrass (*Spartina patens*), Seaside Plantain (*Plantago maritima*) and Sea Lavender (*Limonium carolinianum*).

Lower Salt Marsh (intertidal zone)

The intertidal zone is dominated by Saltwater Cordgrass (*Spartina alterniflora*). This habitat floods twice daily with the normal tidal cycle. It occurs along the sides of tidal creeks (Figure 22), which are common within the salt marsh habitat on Boot Island. This intertidal habitat also occurs along much of the shoreline. Occasional plants of Sea Lavender (*Limonium carolinianum*), Orache species (*Atriplex* spp.) and Jointed Glasswort (*Salicornia europaea*) occur amongst the *Spartina* grass.

Figure 22. The intertidal zone along the shoreline and within the tidal creeks (photo) is vegetated primarily with Saltwater Cordgrass (*Spartina alterniflora*). Occasionally other species such as Sea Lavender (*Limonium carolinianum*) and Jointed Glasswort (*Salicornia europaea*) also occur within the intertidal zone but always in very limited numbers.

6. Tidal Pools and Barachois Pond

At the landing beach on the upper southeast side of Boot Island there is a barachois pond (Figure 24). This was densely vegetated with Ditch-grass (*Ruppia maritima*).

This same species also occurred in many of the salt marsh tidal pools.

One dried up pool at the head of the salt marsh (Figure 14) had Lesser Duckweed (*Lemna minor*) stranded over the surface.

A zone of Saltwater Cordgrass (*Spartina alterniflora*) occurs around the tidal pools within the middle marsh as well as along the perimeter of the barachois pond (Figure 23).

Figure 23. The barachois pond occurring on Boot Island at the boat landing on the upper southeast side of the island.

Table 1. Rare plant species observed in the Boot Island National Wildlife Area. This table lists those species with an ACCDC Sub-national (provincial) Rank of S3 or lower.

Scientific Name	Common Name	ACCDC Rank	Map Coordinates	Comments
Iva frutescens	Big-leaf Marsh-elder	S2SE	1) 400090E 4999557N; 2) 400234E 4999308N (NAD 27)	A combination of 2 ranks indicates uncertainly about the exact rarity of the Element. Here there seems to be uncertainty about whether this species is native or exotic. If it is native then it has a fairly significant rarity ranking. This species was found at 2 locations on Boot Island in the upper salt marsh.
Suaeda calceoliformis?	American Sea-blite	S2S3	400963E 4999399N (NAD 27)	This is a tentative identification. It is recommended that confirmation be obtained from a botanist with expertise in the Chenopodiaceae Family (Goosefoot Family). Plants believed to belong to this species were found on the sand beach near the east end of Boot Island.

Table 2. Percentage of exotic or non-native plant species occurring within each habitat type on Boot Island.

Sand Beach	Wooded Upland	Open Upland (field)	"Island" Upland	Bank (Cliff) Face	Upper Salt Marsh	Middle Salt Marsh	Lower Salt Marsh (intertidal)	Tidal Pools & Barachois Pond
22.7%	27.3%	35.1%	28.6%	51.4%	4.5%	0%	0%	0%

Conclusions

Boot Island has a history of settlement (Bleakney, 2004); first by the Acadians and later by Planters and then others. These groups farmed the land. The last residents left in 1913. The island

is now a National Wildlife Area and continues to be the site of a number of bird nesting colonies the largest of which is a gull colony. The island is also eroding at a significant rate (Bleakeney, 2004). All of these activities/events have allowed a significant number of exotic or non-native species to establish and thrive on the island primarily within the upland areas and the bank/cliff on the east end of the island. The eroding bank on the east end of the island has the highest percentage of exotic species of any habitat on the island (Table 2) suggesting that there is a very high level of disturbance occurring within this particular habitat.

The dense and vigorous vegetation present in many parts of the upland areas suggests that the soil is very rich. This is most likely due to the addition of bird excrement over the course of many years.

Rare species appear to be unusual on Boot Island (Table 1). This may reflect the limited surface area on the island, the introduction of exotic species that may out compete some native species and the relatively limited species diversity associated with salt marshes.

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APPENDICES

APPENDIX A

Species list for the Boot Island National Wildlife Area by habitat with ACCDC Sub-national Ranks provided (refer to APPENDIX B for an explanation of ACCDC Ranks). *Relative abundance* indicators are also provided for each species within each habitat (A = abundant, LA = locally abundant, C = common, LC = locally common, S = scattered, O = occasional, U = uncommon; *X-X* indicates a range in abundance, e.g., O-S indicates that the abundance of the species over a particular habitat ranges from occasional to scattered).

SCIENTIFIC NAME	COMMON NAME	ACCDC PROVINCIAL STATUS RANK	HABITATS								
			SAND BEACHES	WOODED UPLAND	OPEN UPLAND (field)	"ISLAND" UPLAND	BANK (CLIFF) FACE	SALT MARSH			TIDAL POOLS & BARACHOIS POND
								UPPER	MIDDLE	LOWER	
Abies balsamea	Balsam Fir	S5		U							
Acer rubrum	Red Maple	S5		U							
Agrostis stolonifera	Spreading Bentgrass	S5SE					O-S	LC			
Agrostis capillaris	Colonial Bentgrass	SE			LA		C				
Alopecurus pratensis	Meadow Foxtail	SE			O-S						
Amaranthus retroflexus	Red-root Amaranth	SE					O-S				
Ambrosia artemisiifolia	Annual Ragweed	S5	O		O-C	S-C		O-A			
Anthemis cotula	Mayweed	SE	U								
Arctium minus	Lesser Burdock	SE		O							
Argentina egedii (Potentilla egedii)	Egede Cinquefoil	S4S5	O					O-C			
Aster acuminatus (Oclemena acuminata)	Wood Aster	S5		O							
Aster novi-belgii (Symphyotrichum novi-belgii)	New York Aster	S5			U						
Atriplex spp.*	Orache species	S5 -S5SE	U-O			C		O-C		O	
Cakile edentula	American Sea-rocket	S5	C								
Carex nigra	Black Sedge	S5			S-C						
Carex paleacea	Chaffy Sedge	S5						C-A			
Carex scoparia	Pointed Broom Sedge	S5			O						
Chenopodium album	White Goosefoot	SE	O-S								S

SCIENTIFIC NAME	COMMON NAME	ACCDC PROVINCIAL STATUS RANK	HABITATS								
			SAND BEACHES	WOODED UPLAND	OPEN UPLAND (field)	"ISLAND" UPLAND	BANK (CLIFF) FACE	SALT MARSH			TIDAL POOLS & BARACHOIS POND
								UPPER	MIDDLE	LOWER	
Chenopodium sp.	a goosefoot		O				S	O-C			
Cirsium arvense	Canada Thistle	SE			O-C		S				
Cirsium vulgare	Bull Thistle	SE		O-S	O-S		O-S				
Cornus canadensis	Bunchberry	S5		U-O							
Crataegus sp.	a hawthorn			O							
Distichlis spicata	Seashore Saltgrass	S4	S						O-C		
Dryopteris carthusiana	Spinulose Shield Fern	S5		U							
Echinochloa crus-galli	Barnyard Grass	SE	U-O								
Echinocystis lobata	Wild Cucumber	SE		O							
Elymus pungens	Coast Wheatgrass		O					O-S			
Elymus repens	Quackgrass	SE	O	O	C	C		O-S			
Epilobium angustifolium (Chamerion angustifolium)	Fireweed	S5		U-O			LC				
Epilobium ciliatum	Hairy Willow-herb	S5			S		S				
Epipactis helleborine	Eastern Helleborine	SE		U							
Equisetum arvense	Field Horsetail	S5		O							
Euthamia graminifolia	Flat-top Fragrant-goldenrod	S5			LC		O				
Festuca rubra	Red Fescue	S5			S						
Galeopsis tetrahit	Brittle-stem Hempnettle	SE			O-S	S					
Galium aparine	Catchweed Bedstraw	SE?		LC							
Galium tinctorium	Stiff Marsh Bedstraw	S5			S-C						
Glaux maritima	Sea Milkwort	S5							U-S		
Gnaphalium uliginosum	Low Cudweed	SE					C				
Hordeum jubatum	Fox-tail Barley	S5	O			S		S			
Ilex verticillata	Canada Holly	S5		O-C	LC	O					
Impatiens capensis	Spotted Jewelweed	S5		LA	LA	U	U-C				
Iris versicolor	Blueflag	S5			O						

SCIENTIFIC NAME	COMMON NAME	ACCDC PROVINCIAL STATUS RANK	HABITATS								
			SAND BEACHES	WOODED UPLAND	OPEN UPLAND (field)	"ISLAND" UPLAND	BANK (CLIFF) FACE	SALT MARSH			TIDAL POOLS & BARACHOIS POND
								UPPER	MIDDLE	LOWER	
Iva frutescens	Big-leaf Marsh-elder	S2SE						U			
Juncus gerardii	Black-grass Rush	S5						O-C			
Juncus tenuis	Slender Rush	S5					C				
Lactuca serriola	Prickly Lettuce	SE			O	U					
Larix laricina	American Larch	S5		U							
Lemna minor	Lesser Duckweed	S5						LC			LC
Limonium carolinianum	Sea-lavender	S5	O						S	S	
Linaria vulgaris	Butter-and-eggs	SE			U						
Lobelia inflata	Indian-tobacco	S5					U				
Luzula multiflora	Common Woodrush	S5					O				
Maianthemum canadense	Wild Lily-of-the-valley	S5		O							
Myrica pensylvanica (Morella pensylvanica)	Bayberry	S5		O	LC						
Phalaris arundinacea	Reed Canary Grass	S5			O-S	C					
Picea glauca	White Spruce	S5		C							
Plantago major	Common Plantain	SE					S				
Plantago maritima	Seaside Plantain	S5	S						U-C		
Poa palustris	Fowl Bluegrass	S5		O	C		O	LC			
Poa pratensis	Kentucky Bluegrass	S5					S				
Polygonum convolvulus	Black Bindweed	SE	U				S				
Polygonum hydropiper	Marshpepper Smartweed	SE			LA						
Polygonum persicaria	Lady's Thumb	SE					S				
Polygonum sagittatum	Arrow-leaved Tearthumb	S5			LA						
Populus tremuloides	Trembling Aspen	S5		O							
Puccinellia americana (P. maritima)	Seaside Alkali Grass	S4S5	S				O		O-C		

SCIENTIFIC NAME	COMMON NAME	ACCDC PROVINCIAL STATUS RANK	HABITATS								
			SAND BEACHES	WOODED UPLAND	OPEN UPLAND (field)	"ISLAND" UPLAND	BANK (CLIFF) FACE	SALT MARSH			TIDAL POOLS & BARACHOIS POND
								UPPER	MIDDLE	LOWER	
Pyrus malus (Malus pumila)	Apple	SE		U-O							
Raphanus raphanistrum	Wild Radish	SE	O		A	C	C-A				
Ribes glandulosum	Skunk Currant	S5		O-C							
Rosa virginiana	Virginia Rose	S5		S	O-C	U	S				
Rubus recurvicaulis	a blackberry	S?			O						
Rubus idaeus ssp. strigosus	Wild Raspberry	S5		C	LC						
Rubus sp.	a blackberry						O				
Rumex acetosella	Sheep Sorrel	SE					C				
Rumex crispus	Curly Dock	SE			O		O				
Ruppia maritima	Ditch-grass	S5									A
Salicornia europaea	Jointed Glasswort	S5	U						U-O	U-O	
Salix bebbiana	Bebb's Willow	S5		U							
Sambucus canadensis	Common Elderberry	S5		O			U				
Sambucus racemosa	Red Elderberry	S5		C		S					
Scirpus maritimus (Schoenoplectus maritimus)	Saltmarsh Bulrush	S4S5						C			
Scirpus tabernaemontanae (Schoenoplectus tabernaemontani)	Soft-stem Bulrush	S5						LA			
Scutellaria galericulata	Hooded Skullcap	S5			U						
Sisymbrium officinale	Hairy-pod Hedge Mustard	SE			A		O-A				
Solanum dulcamara	Climbing Nightshade	SE		S			U				
Solidago canadensis	Canada Goldenrod	S5		O-S	U-O		O				
Solidago rugosa	Rough Goldenrod	S5		S-C	O-C	C	O				
Solidago sempervirens	Seaside Goldenrod	S5	O			S		O	O-S		

SCIENTIFIC NAME	COMMON NAME	ACCDC PROVINCIAL STATUS RANK	HABITATS								
			SAND BEACHES	WOODED UPLAND	OPEN UPLAND (field)	"ISLAND" UPLAND	BANK (CLIFF) FACE	SALT MARSH			TIDAL POOLS & BARACHOIS POND
								UPPER	MIDDLE	LOWER	
Sonchus arvensis	Field Sowthistle	SE			S-C		S				
Sonchus asper	Spiny-leaf Sowthistle	SE					O				
Spartina alterniflora	Saltwater Cordgrass	S5							U-S	A	
Spartina patens	Salt-meadow Cordgrass	S5	C					C	S-A	O-S	
Spartina pectinata	Freshwater Cordgrass	S5						C			
Spergularia canadensis	Canada Sand-spurrey	S4							O		
Spergularia marina (S. salina)	Purple Sand-spurrey	S5	O					O-S	O		
Stellaria graminea	Little Starwort	SE			O-C						
Stellaria media	Common Starwort	SE			O-C		S				
Suaeda calceoliformis?	American Sea-blite	S2S3	U								
Suaeda maritima	Maritime Sea-blite	S5	O-A					O-S			
Taraxacum officinale	Common Dandelion	SE					O				
Trifolium repens	White Clover	SE					C				
Triglochin maritima	Common Bog Arrow-grass	S5							U-S		
Tussilago farfara	Colt's-foot	SE					O				
Typha latifolia	Broad-leaf Cattail	S5						LC			
Urtica dioica ssp. gracilis	Stinging Nettle	S4		LC			LC				
Vicia sp.	a vetch	SE			S						

* includes the following species: *Atriplex patula* (S5SE), and A. *prostrata* (S5)

APPENDIX B

Explanation of the Atlantic Canada Conservation Data Centre (ACCDC) sub-national ranks. Further information can be found at the ACCDC website: http://www.accdc.com/products/lists/ranks/.

S1 Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.

S2 Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.

S3 Uncommon throughout its range in the province, or found in a restricted range, even if abundant at some locations (21 to 100 occurrences).

S4 Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g. watch list). 100+ occurrences.

S5 Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.

S#S# Numeric range rank: A range between two consecutive numeric ranks. Denotes uncertainty about the exact rarity of the Element (e.g., S1S2).

S#? Denotes inexactness, uncertainty about the numeric rank.

SE Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.

HYB Denotes hybrid status.